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Economic Vulnerability among Low-Educated Europeans

Resource, Composition, Labour Market and Welfare State Influences

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abstract: In this article, we pose the question: To what extent does a lack of individual resources and of access to high quality resources in one's core social network explain why low-educated people are likely to experience economic vulnerability? Additionally, we explain cross-national differences in the risk that the low-educated run in terms of economic vulnerability. Multi-level models estimated for 22 countries of the European Social Survey show that a lack of labour market success and partner's resources explain why the low-educated are likely to suffer from economic vulnerability. Next, we find a number of determinants to explain why the low-educated are better off in some countries than in others, i.e. cross-national variation in access of the low-educated group to high quality social resources, beliefs about the productivity of the group as a whole, structural labour market conditions and welfare state arrangements. In so far as welfare states can influence the contexts in which their (low-educated) citizens live, to a great extent they can also reduce economic vulnerability among the low-educated.

Keywords: compositional characteristics ◆ economic strain ◆ economic vulnerability ◆ educational attainment ◆ labour market conditions ◆ low income ◆ resources ◆ welfare state arrangements

Introduction and questions

Economic vulnerability has severe negative consequences for people who have to endure such situations and for the localities in which they live (Wilson, 1987; Brooks-Gunn et al., 1997). Higher crime rates and lower health levels are just two examples. Reducing economic vulnerability occupies a top position on the policy agendas of governments of Western countries. Therefore, it is essential to improve our understanding of its determinants as well as gain insight to why in some contexts the impact of these determinants might be stronger than in others.

As a lack of educational qualifications stands out as an important determinant of economic vulnerability, this article focuses on the likelihood of low-educated individuals, compared to their better qualified citizens, of experiencing such a negative situation. We aim to (1) explain why the low-educated are relatively likely to be economically vulnerable, (2) describe

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cross-national differences in the relative risk of economic vulnerability, and (3) explain why in some countries the low-educated are relatively worse off than in other countries.

In this article, economic vulnerability is composed of a household's relative position in the income distribution within a country, and the extent to which a household has difficulty living on the existing income. The measure is therefore linked to the operationalization of economic vulnerability of Whelan and Maître (2005), which showed that household income, economic strain and current lifestyle deprivation indicate one single latent construct: economic vulnerability. We take advantage of the availability of this measure in a high quality data source (European Social Surveys (ESS) in 2002, 2004 and 2006) recently collected in 22 European countries in order to generate more general insights on the European population.

Theoretical background

Economic vulnerability among the low-educated: individual-level explanations

Generally, economic vulnerability becomes more likely if one is unable to generate enough income, and/or if expenses and needs are too high. Individual and social resources are generally referred to as indicating the opportunity to generate income to fulfil needs (Becker, 1964; Mincer, 1974), while household characteristics, such as the number of children and adults (and marital status), are typical needs indicators (Goodin et al., 1999; Muffels and Fouarge, 2004). To explain why the low-educated are relatively more prone to economic vulnerability, we focus particularly on their lack of individual and social resources, and at the same time control for the composition of the household in which they live.

Individual resources. First, educational attainment is strongly related to other individual resources that directly or indirectly produce lower risks of economic vulnerability. Previous research has shown that a lack of qualifications is a strong determinant of economic vulnerability, due to the fact that low-educated individuals are less likely to be successful in the labour market in terms of both participation and job position (e.g. Layte et al., 2001a; Layte and Whelan, 2002; Tsakloglou and Papadopoulos, 2002; Muffels and Fouarge, 2004). Low-educated individuals are – or may be perceived to be – less productive in the labour market than high-educated persons, which explains why educational attainment is an important explanatory factor for labour market success (Arrow, 1973; Thurow, 1975; Shavit and Müller, 1998; Kerckhoff et al., 2001; Solga, 2002). Consequently, low-educated individuals are relatively likely to be economically inactive or unemployed. If they are active in the labour market, they often work in insecure, low status jobs, and therefore receive relatively low levels of income. Moreover, the shorter one's educational career, the lower that person's level of crystallized cognitive competence will be (Alwin, 1991; Gesthuizen and Kraaykamp, 2002). Cognitive competence is known to affect labour market success independently of educational attainment, and therefore has an influence on income generated (Kerckhoff et al., 2001). But besides influencing career opportunities, cognitive competence is also important in finding ways of overcoming economic vulnerability when confronted with it; for instance, through knowing which social security benefits one is entitled to, and how to apply for them. We therefore hypothesize that low-educated individuals are relatively prone to economic vulnerability, because they may be unsuccessful in the labour market or more likely to work in low status jobs (hypothesis 1) and have relatively low levels of cognitive competence (hypothesis 2). That is, educational differences in economic vulnerability may partly be explained by a lack of labour market success and a low level of cognitive competence of the low-educated.

Social resources. Educational attainment is not just an individual resource, as it clears the way to building a social network in which many opportunities can be created to achieve more and to

help in coping with economic adversity (Coleman, 1988). Social resources are important in helping us stay out of, or escaping from, situations of economic vulnerability: via these social resources information is gathered about vacancies, access is generated to economic positions (Granovetter, 1973; Lin, 1999), and, if necessary, help can be expected in the form of direct money transfers from family and friends. Generally, low-educated people may have fewer social resources than high-educated individuals, because low educational attainment is often reproduced across generations (Shavit and Blossfeld, 1993; Breen and Goldthorpe, 1997; Gesthuizen et al., 2005) and clusters within affective relationships (Ultee and Luijkx, 1990; Kalmijn, 1998; McPherson et al., 2001; Hamplova, 2009). We therefore hypothesize that low-educated individuals are relatively more prone to economic vulnerability (educational differences in economic vulnerability are partly explained), because they may be more likely to have low-educated parents (hypothesis 3) and low-educated spouses (hypothesis 4).[1]

Economic vulnerability among the low-educated: contextual-level explanations

Previous research has already focused on the impact of welfare state arrangements and labour market institutions on national differences in general poverty risks (Tsakloglou and Papadopoulos, 2002; Muffels and Fouarge, 2004; Dewilde, 2008; Lohmann, 2009). However, whereas these studies reported dissimilar odds ratios across nations of the relative risk that low-educated people run to experience some form of economic vulnerability (Layte and Whelan, 2002; Tsakloglou and Papadopoulos, 2002), the varying impact of education across nations has not yet been explained. A crucial, yet unanswered, question is thus whether contextual characteristics have varying impacts on economic vulnerability for different educational groups.

Recently, theoretical explanations have been proposed stressing that in some countries the lower educated are economically more vulnerable than in other countries due to a lack of individual and social resources within the group of low-educated people as a whole, or, in other words, at the micro-level of societies (Solga, 2002, 2008; Gesthuizen et al., 2010). These hypotheses, however, have not yet been tested for measures of economic vulnerability based on income. Other explanations focus on the meso-level of societies, considering different labour market qualities of societies. A third group of explanations focuses on macro-level societal conditions. We address these different determinants below.

The proposed explanations focusing on the micro-level of societies (Solga, 2002, 2008; Gesthuizen et al., 2010) stress that, depending on the characteristics of the group of low-educated persons in a country, employers differ in their beliefs about the group's productivity as a whole. Based on probabilistic beliefs – also called statistical discrimination (Arrow, 1985) – low-educated workers are perceived to have poorer cognitive skills and, thus, lower trainability. The proportion of low-educated people with a low cognitive competence in a country could therefore influence, over and beyond individual cognitive competence, the employers' estimation of their trainability, decreasing their likelihood of labour market success and thus of the generation of a 'decent' income. We therefore assume that the higher the proportion of low-educated people with low cognitive competence is within a country, the larger the difference in economic vulnerability between the low and higher educated (hypothesis 5).

Countries also differ in their level of openness, i.e. in the extent of access to high quality social resources that people have with lower levels of individual resources. This differential access induces different opportunities for the low-educated to stay out of, or to cope with, economic vulnerability (Solga, 2002, 2008; Gesthuizen et al., 2010). The less (weak) ties there are at the societal level between low-educated individuals and the high-educated, the less likely the former are able to profit from the resources of the latter (Granovetter, 1973). A widely used indicator of openness is the extent of educational homogamy within couples (Ultee and Luijkx, 1990; Kalmijn, 1998; Hamplova, 2009; Huijts et al., 2009) and the extent to which low educational attainment is reproduced across generations (Shavit and Blossfeld, 1993; Breen and

Goldthorpe, 1997; Gesthuizen et al., 2005). The more educational attainment is reproduced across generations and the more low-educated persons have low-educated spouses, the more the social networks of the low-educated are impoverished in terms of access to high quality resources (Solga, 2008). Lacking such resources clearly reduces labour market opportunities (Granovetter, 1973; Ultee et al., 1988; Lin, 1999; Verbakel and De Graaf, 2008), and consequently opportunities to generate a 'decent' income. In sum, we assume that the higher the proportion of lower-educated parents (hypothesis 6) and lower-educated spouses (hypothesis 7) is within a country's group of low-educated people, the larger the difference in economic vulnerability there will be between the low and higher educated.

Next, we focus at the meso-level addressing specific structural labour market conditions of a country, such as the level of displacement and demand for low-skilled work, which probably has an impact on the level of economic vulnerability of the low-educated. Technological developments in modern labour markets have led to a demand shift from a low-skilled to a high-skilled labour force (Kerr et al., 1960; Bell, 1974; Levy and Murnane, 1992; Krueger, 1993). At the same time, however, the supply of higher skilled workers has increased even faster than the demand due to educational expansion (Berg, 1971; Livingstone, 1998; Wolbers et al., 2001), leading to higher-educated workers cascading downward on the economic ladder and taking jobs previously carried out by lower-educated workers (Thurow, 1975). The latter end up in the worst jobs or even in unemployment. It can be assumed that the stronger the displacement in a country is of low-educated workers by higher-educated workers, the larger will be the difference in economic vulnerability between the low and higher educated (hypothesis 8a). However, this displacement process also increases the share of (somewhat) higher-educated individuals in the lowest regions of the income distribution, reducing differences in economic vulnerability between the low and higher educated (hypothesis 8b).

This demand shift from a low-skilled to a high-skilled labour force has also resulted in an upgrading of the quality of jobs in the lower parts of the occupational structure (Berman et al., 1998; Spitz-Oener, 2006) and thus to decreasing shares of elementary, low-paid jobs. This means that in some countries – those with the highest level of this so-called 'skill biased technological change' – the low-educated have access to jobs that are still at the bottom of the distribution, but which nevertheless have relatively favourable characteristics (a decent wage, not too dangerous, in the service class). We thus expect that the higher the quality of the lowest status jobs in a country, i.e. the higher the average socio-economic status is with a country's group of lower educated workers, the smaller the difference in economic vulnerability there will be between the low and higher educated (hypothesis 9).

Last but not least, we focus at the macro-level considering welfare state arrangements that are likely to affect the level of economic vulnerability of low-educated individuals. Welfare states differ in the extent to which they spend on social security to provide an economic safety net for their citizens, so that if someone becomes unemployed or disabled, or retires, that person is safeguarded from severe economic vulnerability. Countries within different welfare state regimes differ in their policies and have specific histories in shaping institutional arrangements, leading to varying levels of welfare state expansion (Esping-Andersen, 1990; Mills and Blossfeld, 2005). As lower-educated individuals are less likely to be successful in the labour market (Shavit and Müller, 1998; Kerckhoff et al., 2001; Solga, 2002) and therefore would gain more from social security than the higher educated, we assume that the higher the social security expenditure of a country, the smaller the difference in economic vulnerability between the low and higher educated (hypothesis 10).[2]

Welfare states also differ in their employment protection legislation (EPL). The stronger this is, the more 'closed' employment relationships are rather than 'open' (Sørensen, 1983). Closed relationships create an insider–outsider problem, because they protect job holders and exclude non-holders, which means that those who are able to attain a stable position in the labour market

are well protected from economic vulnerability: employed workers are less exposed to external competition and, thus, to the risk of dismissal. Generally, the low-educated are less likely to attain a stable and secure position in the labour market (Kalleberg, 2009), and we argue that this would be even more so in countries with strong EPL. We therefore assume that the stronger the employment protection legislation in a country is, the more the lower-educated will suffer from economic vulnerability compared to the higher educated (hypothesis 11).

Data, measurements and methods

The European Social Survey

The European Social Survey (ESS) is well suited for our purpose. This cross-national data source uses random, i.e. probability, procedures to maximize the likelihood of the samples being representative. Response rates are high as a result of the organization's target of reaching at least 70 per cent (available at www.europeansocialsurvey.org for fieldwork documentation). Besides being a high quality, cross-nationally comparable data source, the ESS uses household income and economic strain to estimate economic vulnerability. Moreover, it contains household characteristics, ethnicity and cognitive competence, individual, spousal and parental educational attainment and several indicators of labour market success as determinants of economic vulnerability. In addition, aggregations of the information on cognitive competence, parental and partner's educational attainment and labour market success can be used to estimate the compositional characteristics of groups of low-educated individuals within countries. We selected 15 to 70-year-old people who were not in school or retired. The final models are based on 49,050 individuals nested in 22 countries from the 2002, 2004 and 2006 rounds.[3] The selection of this set of countries is based on the fact that, in these countries in these rounds, both household income and economic strain were available. Yet, considering these countries at three time-points increases the robustness of the analyses and the insights to be derived. Table 2 (see Results section) indicates the countries that are included.

Dependent variable: economic vulnerability

Economic vulnerability was constructed by combining two variables: household income and economic strain. The ESS registers household income in 12 categories, ranging from €75 to €11,250 per month. The categories are the same in all nations. As such, this income variable cannot be used for cross-national comparisons. Several steps were taken to facilitate cross-national comparability, and to arrive at the final scale, which is a percentile score exemplifying economic vulnerability (Whelan and Maître, 2005) from being in the lowest percentile (0) to being in the highest (100). First, the values of these 12 categories of household income were divided by the square root of the size of the household (square root OECD equivalence scale: see www.oecd.org/dataoecd/61/52/35411111.pdf) to correct household income for household size. After having assigned this equivalent household income to each household member, percentile scores were calculated *within* each country. As this score determines the relative position of a household member in a standardized income distribution, this procedure facilitates cross-national comparability. Second, for the respondent's 'feeling about the household's income nowadays' (economic strain) the four categories, (4) living comfortably, (3) coping on the present income, (2) difficult living on the present income, and (1) very difficult living on the present income, were also transformed into percentile scores for each country separately. Both percentile scores of the indicators of economic vulnerability correlate to 0.47. Third, subsequently we calculated the average percentile score and reversed the variable; thus, a higher score exemplifies a higher level of economic vulnerability.

This variable has several advantages. First, the distributions of income and economic strain are standardized to facilitate cross-national comparability. Obviously, this is crucial for a valid

Table 1 *Economic vulnerability in Europe, coefficients of multi-level models, 22 countries, 49,050 individuals*

	Model 0	Model 1a	Model 1b	Model 1c	Model 1d	Model 1e
Educational attainment (low=ref.)						
Intermediate		−11.58**	−6.80**	−6.15**	−5.75**	−4.16**
High		−22.99**	−11.73**	−10.93**	−10.27**	−7.38**
Employment status (full-time work=ref.)						
Inactive			8.83**	8.72**	8.76**	9.09**
Unemployed			22.35**	22.01**	22.01**	21.63**
Working 0 to 11 hours			6.85**	6.96**	7.03**	7.60**
Working 12 to 24 hours			5.58**	5.51**	5.52**	6.05**
Working 25 to 34 hours			2.18**	2.10**	2.12**	2.69**
Socio-economic status (0 – 90)			−0.35**	−0.33**	−0.33**	−0.29**
Evaluated cognitive competence (low=ref.)						
Intermediate				−2.83**	−2.78**	−2.59**
High				−6.79**	−6.66**	−6.16**
Education parents (low=ref.)						
Intermediate					−2.07**	−1.39**
High					−2.02**	−1.15**
Partner (yes=ref.)						
No partner		12.98**	11.18**	11.07**	11.08**	
Partner (low-educated, not working=ref.)						
No partner						−0.64*
Low-educated, low SES						−5.91**
Low-educated, intermediate SES						−11.43**
Low-educated, high SES						−18.07**
Intermediate-educated, not working						−5.32**
Intermediate-educated, low SES						−8.02**
Intermediate-educated, intermediate SES						−14.68**
Intermediate-educated, high SES						−18.90**
High-educated, not working						−10.42**
High-educated, low SES						−8.17**
High-educated, intermediate SES						−18.02**
High-educated, high SES						−20.73**
ESS round (1=ref.)						

(continued)

Table 1 *(continued)*

	Model 0	Model 1a	Model 1b	Model 1c	Model 1d	Model 1e
2		0.52*	0.23	0.48*	0.47*	0.53*
3		1.01**	0.79**	0.93**	0.98**	1.23**
Gender (male=ref.)						
Female		3.04**	0.74**	0.58**	0.55**	0.45*
Number of persons in household (1 – 15)		0.50**	0.26**	0.22**	0.21*	0.25**
Children in household (youngest over 18=ref.)						
No children		−4.59**	−5.19**	−5.24**	−5.25**	−4.87**
Youngest between age 0 and 3		9.35**	7.69**	7.65**	7.67**	8.29**
Youngest between age 4 and 12		6.82**	6.00**	6.02**	6.01**	6.37**
Youngest between age 13 and 18		3.79**	3.62**	3.63**	3.64**	3.90**
Age (0 – 5.5)		−1.83**	0.20	0.33	0.01	0.27
Age squared (0 – 30.25)		0.39**	−0.06	−0.10	−0.07	−0.13*
Ethnicity (born in country=ref.)						
Born outside country		5.97**	4.59**	4.08**	4.06**	4.01**
Urbanization (city=ref.)						
Suburb		−2.44**	−2.34**	−2.23**	−2.26**	−2.29**
Small town		0.61**	−0.05	−0.02	−0.12	−0.36
Village		0.43∼	−0.58*	−0.57*	−0.71**	−1.09**
Farm		3.16**	1.32**	1.48**	1.31**	0.77*
Constant	38.59**	41.34**	51.15**	55.48**	56.46**	62.48**
Individual level variance	643.24**	528.19**	462.73**	458.82**	458.12**	435.89**
Country level variance	1.27	8.86**	5.35**	5.33**	6.75**	8.96**
Log likelihood	−228208	−223396	−220149	−219940	−219905	−218680

Source: ESS 2002, 2004 and 2006.
∼ $p < 0.10$; *$p < 0.05$; **$p < 0.01$ (based on one-sided tests).

Table 2 *Educational differences in economic vulnerability[1] in Europe, 22 countries, 49,050 individuals[2]*

	% low-educated	Odds ratios low–intermediate	Odds ratios low–high
Austria	20.3	2.12	4.66
Belgium	33.2	2.76	9.24
Czech Republic	40.9	2.76	9.86
Denmark	31.3	1.47	2.93
Finland	28.8	1.23	3.18
France	27.8	1.94	6.08
Germany	36.5	3.29	7.26
Greece	29.6	2.79	6.49
Hungary	28.1	2.68	8.39
Ireland	33.8	2.30	4.63
Italy	23.6	2.51	6.66
Luxembourg	29.6	3.10	13.19
Netherlands	30.2	2.24	5.83
Norway	32.9	1.33	2.99
Poland	29.1	3.62	11.03
Portugal	22.9	3.26	13.82
Slovakia	50.0	4.14	17.29
Slovenia	29.6	4.27	16.95
Spain	27.3	3.80	8.66
Sweden	24.3	1.17	2.57
Switzerland	37.9	4.57	12.77
United Kingdom	30.7	1.99	4.09

Source: ESS 2002, 2004 and 2006.
[1]To calculate odds ratios, the 25 per cent economically most vulnerable has been coded 1, and the others 0.
[2]All odds ratios are significant.

test of our hypotheses. Second, the procedure combines objective income with the subjective (dis-)ability to live on it, which makes it a more reliable and more valid measurement of the theoretical construct that we wish to measure, i.e. economic vulnerability (e.g. Layte et al., 2001a, b; Whelan et al., 2004; Halleröd and Larsson, 2008). It would not make sense to label a low income as economically vulnerable if one was able to live easily on it. The other way round also holds: people with a higher income level can (still) experience economic strain, which implies that this household should receive a higher score on the economic vulnerability scale than its income level would suggest.[4] Third, the coefficients of the models (see below) are easy to interpret. If one, for instance, looks at model 1b in Table 1, the constant is 51.15, which means that respondents belonging to all reference categories, among which are the full-time employed, are in the 51st percentile of economic vulnerability. The coefficient of 22.35 for the unemployed indicates that on average they are in the 74th percentile (51.15 + 22.35).

Independent variables: individual characteristics

Educational attainment was originally measured in six cross-nationally comparable categories. These were reduced to three categories pertaining to primary or lower secondary education (i.e. the low-educated), higher secondary or post-secondary non-tertiary (i.e. the intermediate-educated), and first or second stage tertiary (the high-educated). For partner's educational attainment and parental educational attainment, the same procedure was applied. As for mothers and fathers there could be a valid score for educational attainment, the highest of both was selected first. After the interview, the interviewer had to estimate how often the respondent understood the

questions. This variable was used as an approximation of cognitive competence. The answers 'never', 'almost never' and 'now and then' were used to indicate a low level, whereas 'often' seems to indicate an intermediate level, and the answer 'very often' a high level of cognitive competence.[5] Employment status is composed of several categories. Respondents can work full time (35 hours per week or more), 25 to 34 hours, 12 to 24 hours or less than 12 hours. Those who do not work are distinguished in the unemployed and otherwise inactive. Moreover, socio-economic status of the current or previous job is used to estimate the job level (based on the ISEI scale of Ganzeboom et al., 1992). For spouses, socio-economic status was available as well. If the respondent had a spouse who did not have a valid score on this ISEI scale, the spouse is considered to be non-working. For spouses who had a valid score, the ISEI scale has been brought back to three categories (10–30, 31–60, 61–90). In our models we combined educational attainment of the spouse with his or her socio-economic status into one variable (see Table 1 for the exact categories).

The composition of the household was operationalized in several ways. First, the number of persons in the household was calculated. Second, whether or not the respondent has a partner was included. This variable was combined with the educational and occupational attainment of the partner. Third, having children (yes or no) was combined with the age of the youngest child (youngest over 18, between 13 and 18, between 4 and 12 and between 0 and 3).

As further control variables, the ESS round has been included (1, 2 and 3), gender, age (centred and divided by 10) and age squared to account for curvilinear age effects, country of birth (born inside or outside country of residence) and urbanization (city, suburb, small town, village, farm).

Independent variables: contextual characteristics

National level characteristics were either distilled from other data sources or aggregated from the ESS. In the former case, we chose national figures provided by well-established institutions pertaining to the year of interview as closely as possible.

To indicate the cognitive competence composition (as a proxy of employers' probabilistic beliefs about the group's productivity), the proportion of people with a low estimated level of cognitive competence within a country's group of low-educated individuals was included. The higher this proportion, the more we assumed that the group as a whole was subject to processes of statistical discrimination, decreasing employment opportunities and thus increasing risks of economic vulnerability.

To indicate the extent to which groups of low-educated people are detached from other social groups with higher levels of resources, two aggregations were performed: the proportion of low-educated parents and the proportion of low-educated spouses within a country's group of low-educated individuals. The higher these proportions, the more networks of low-educated people are impoverished in terms of social resources.

Structural labour market conditions were indicated by two indices. First, we constructed a high-skill supply–demand ratio for studying the extent to which the income situation of the low-educated is affected by processes of displacement. The index is the percentage of tertiary educated within a country divided by the percentage of people working in jobs with a socio-economic status of at least 60. The higher the index, the higher the supply of higher-educated individuals relative to the demand for high-skilled work. Second, the quality of lower status jobs was approximated by the average socio-economic status of jobs of the group of low-educated individuals within a country, and was aggregated from the ESS. The higher this average, the higher the quality of jobs there is within a country to which lower-educated individuals have access.

We also used two measures for welfare state arrangements. First, social security expenditure was measured as the percentage of GDP spent on social protection, which is provided by Eurostat. This institution describes it as social benefits, which consist of transfers, in cash or kind, to households and individuals to relieve them of the burden of a defined set of risks and needs (see

note 2). Second, for employment protection legislation (EPL) the overall OECD index was used, which measures the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts – the higher the index, the stronger the EPL.

All national characteristics have been centred on their grand means. To facilitate interpretation of their coefficients, some have additionally been multiplied or divided by 10. The descriptives of the contextual and individual characteristics can be found in Table A1 in the appendix. Table A2 shows the correlations between the contextual characteristics. Generally, these correlations are weak to moderate. Only for the two indicators of access to social resources is there a correlation which is too strong (0.92) for them to be included simultaneously in one model.

Multi-level analysis with cross-level interactions

The description of results consists of two parts: (1) explaining at the individual level why low-educated people are relatively likely to experience economic vulnerability, and (2) explaining cross-national variation in these risks. As individuals are nested within countries and economic vulnerability is a continuous variable, linear multi-level random intercept models are used (estimated with R).

To test our hypotheses in the first part, a series of models is estimated (Table 1, models 0 to 1e) in which explanatory variables for the relationship between education and economic vulnerability were included, one at a time. In the second part, where we test our contextual hypotheses, we include cross-level interactions between educational attainment and the contextual characteristics (Table 3, models 2a to 3). We started by estimating models in which only one contextual characteristic was included and its interaction with education. However, as we are primarily interested in substantial results, that is, in estimating results of simultaneously included variables leading to significant improvements of fit, we also present one final model that is the result of a forward stepwise selection procedure. This procedure first adds the contextual characteristic plus its interaction with education that results in the strongest reduction of the log likelihood. After that, additional contextual variables and interactions are included step by step, as long as the fit of that model significantly increased, compared to the previous model. We have already discussed the strong correlation between the two indicators of access to social resources (the proportion of low-educated parents and of low-educated spouses correlate 0.92 at the country level). To avoid problems of multi-collinearity, we never included both contextual characteristics in the same model.

Findings

Economic vulnerability among the low-educated: individual explanations

Results from testing the individual level hypotheses can be found in Table 1. Model 1a includes educational attainment and all control variables. According to this model, which clearly has a better fit than the null model, the low-educated are in the 41st percentile of economic vulnerability, the intermediate educated in the 30th (41.34–11.58) and the high educated in the 18th (41.34–22.99).

Labour market success is included in model 1b, and clearly it strongly influences economic vulnerability. As compared to being in full-time employment, the unemployed can be found 22 percentiles higher in the economic vulnerability distribution (51.15+22.35=in the 74th percentile). Being in small part-time jobs (0 to 24 hours) and being otherwise inactive also increases the level of economic vulnerability experienced. Furthermore, each unit increase in socio-economic status decreases economic vulnerability by 0.35 percentiles. Including these indicators of labour market success strongly reduces educational differences in economic vulnerability, i.e. by 41 and

Table 3 *Economic vulnerability in Europe, coefficients[1] of multi-level models, cross-level interactions of educational attainment with contextual characteristics, 22 countries, 49,050 individuals*

	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e	Model 2f	Model 2g	Model 3[2]
Educational attainment (low=ref.)								
Intermediate	−4.15**	−4.03**	−3.75**	−4.15**	−4.26**	−4.12**	−4.16**	−3.96**
High	−7.58**	−7.14**	−6.93**	−7.71**	−7.56**	−7.70**	−7.38**	−7.56**
Contextual characteristics								
Prop. low cognitive competence within low-educated group	1.58*							1.26*
Prop. low-educated parents within low-educated group		−10.22**						
Prop. low-educated spouses within low-educated group			−7.99**					−11.46**
High skill supply-demand ratio				−0.03				−0.12
Average SES within low-educated group					−0.95			0.66
Social security expenditure						−0.27		−0.98
Employment protection legislation							−1.24	
Interactions								
Prop. low cognitive competence*intermediate	−2.62**							−1.70**
Prop. low cognitive competence*high	−3.93**							−3.37**
Prop. low-educated parents*intermediate		−4.63**						
Prop. low-educated parents*high		−2.46						

(continued)

Table 3 *(continued)*

	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e	Model 2f	Model 2g	Model 3[2]
Prop. low-educated spouses*intermediate			−8.50**					−4.84**
Prop. low-educated spouses*high			−7.52**					−1.30
High skill supply-demand ratio*intermediate				0.37**				0.25**
High skill supply-demand ratio*high				0.64**				0.48**
Average SES*intermediate					4.57**			1.99*
Average SES*high					3.31**			−1.92
Social security expenditure*intermediate						3.08**		2.04**
Social security expenditure*high						2.95**		3.06**
Employment protection legislation*intermediate							−0.46	
Employment protection legislation*high							−0.31	
Constant	62.10**	62.59**	62.34**	62.39**	62.53**	62.57**	62.50**	62.36**
Individual level variance	435.22**	435.83**	435.61**	435.36**	435.65**	435.54**	435.90**	434.46**
Country level variance	9.26**	4.57**	2.77	8.66**	9.66**	8.83**	8.51**	2.51**
Log likelihood	−218640	−218664	−218646	−218652	−218662	−218657	−218677	−218575

Source: ESS 2002, 2004 and 2006.
∼ $p < 0.10$ * $p < 0.05$, ** $p < 0.01$.
[1]Models contain the same individual level variables as Model 1e, Table 1.
[2]This model is the final result of a forward stepwise procedure (see Table A3 in the Appendix).

49 percent (when comparing low-educated with intermediate and high-educated, respectively). Therefore hypothesis 1 is confirmed.

Cognitive competences are included in model 1c, which shows that respondents with a higher level of estimated cognitive competence are almost 7 percentiles lower on the economic vulnerability scale than respondents with low-estimated levels, independently of individual educational attainment, labour market success and other control variables.[6] Educational differences in economic vulnerability, however, remain largely identical, which rejects hypothesis 2.

Parental educational attainment is included in model 1d. The results show that an intermediate and high parental educational level is associated with 2 percentiles less on the economic vulnerability scale compared to low parental educational attainment. Again there is hardly any reduction in the educational differences in economic vulnerability. Therefore, hypothesis 3 is rejected.

Finally, the influence of the resources of the spouse is added in model 1e. Having a low-educated partner who does not work, which is the reference group, is most disadvantageous: the constant implies that they reside in the 62nd percentile, *ceteris paribus*. Having no partner is almost equally disadvantageous (the b-coefficient is –0.64). The results show that a spouse's educational level independently affects economic vulnerability. Having an intermediate-educated spouse who does not work implies an economic vulnerability score of 5 percentiles less, and having a higher-educated spouse who does not work even to a drop of more than 10 percentiles. It also shows that within educational categories of the spouse a higher level of labour market success reduces economic vulnerability. Furthermore, educational differences are further reduced by 28 per cent, which we consider clear evidence supporting hypothesis 4.

If we compare models 1a and 1e, 64 and 68 per cent, respectively, of the educational differences in economic vulnerability are explained in total by including individual and social resources.

Economic vulnerability among the low-educated: contextual explanations

In this section, we test our contextual explanations, but before we come to that, Table 2 shows that there are large cross-national differences in the relative risk of low-educated people experiencing economic vulnerability. For instance, in Sweden the low-educated are 1.17 times more likely than the intermediate educated to be in the top quarter of the economic vulnerability distribution, while in Switzerland the corresponding odds ratio is 4.57.

Explanations for this variation are tested in Table 3. The cross-level interactions included in these models indicate the extent to which the educational differences in economic vulnerability vary across national contexts. Models in which only one contextual characteristic was included, and its interaction with education (models 2a to 2g), show support of all cross-level interaction hypotheses except employment protection legislation (which rejects hypothesis 11). However, some contextual characteristics might contribute more to a better fit than others, and educational differences resulting from variation in one contextual characteristic might be biased if other important explanations for educational differences are neglected. We therefore only discuss the results from the final model (Table A3 in the appendix gives the steps taken to arrive at the final model).

In hypothesis 5 we argued that the larger the proportion of people with a low level of cognitive competence within the low-educated group, the larger the educational differences in economic vulnerability. Hypothesis 5 is supported. Model 3 shows significant and negative interactions, implying that educational differences are larger in countries where the cognitive composition of the low-educated group is more unfavourable. According to this model, in the country with the lowest proportion of low-educated with low cognitive competence, the low-educated have a 2.36 percentile higher economic vulnerability than the intermediate educated. When the proportion is highest, this percentile difference is clearly larger, that is, 7.46. Percentile differences between the low and high educated are 4.39 and 14.50, respectively.[7]

We also hypothesized that in countries where access to high quality resources in social networks is more restricted, educational differences in economic vulnerability will be larger. As the stepwise selection procedure (Table A3) showed that adding the spouse's education (hypothesis 7) improves the fit the most, and adding parental educational attainment (hypothesis 6) would lead to multicollinearity, we only tested hypothesis 7. We find that in the case of the lowest proportion of low-educated spouses within a country's low-educated group, the percentile difference with the intermediate educated would be an estimation of 2.41. When the proportion is highest, the estimated difference is 5.51 (the interaction effect of –4.84 is significant). Hypothesis 7 is therefore supported.

When looking at the indicators for structural labour market conditions, we find significant positive interactions for the high-skill supply–demand ratio, implying that hypothesis 8a is rejected and 8b confirmed. A relatively high supply of higher educated is most unfavourable for the higher educated themselves, because they have to accept jobs at a lower level, while the low-educated are often already at the bottom of the occupational ladder, reducing educational differences in economic vulnerability. Hypothesis 9 stated that the higher the average socio-economic status within the low-educated group of a country, the higher the quality of the jobs that they have access to, and therefore the smaller the educational differences in economic vulnerability there will be. Indeed, the percentile difference between the low- and intermediate-educated is significantly smaller in countries where the average SES of the low-educated is higher. When the average SES is highest, the percentile difference between the two groups is 2.91. In the case of the lowest average SES, the difference is 5.19.

Turning to the effects of welfare state arrangements, according to hypothesis 10 educational differences in economic vulnerability should be smaller in countries with a high level of social security expenditure. As the interaction effects are positive and significant, this hypothesis is supported. When social security expenditure is highest, the percentile difference in economic vulnerability between the low- and intermediate-educated is 2.40, while it is 5.73 when expenditure is lowest. If we compare the low-educated with the high-educated, these percentile differences are 5.23 and 10.22, respectively.

Conclusions

This study aimed to explain why the low-educated are relatively likely to experience economic vulnerability at both an individual and contextual level. At the individual level, we looked at the extent to which individual and social resources explained educational differences in economic vulnerability. To explain country variation, we studied contextual factors related to beliefs about the group's productivity as a whole, a lack of access to high quality resources in one's social network, structural labour market conditions and welfare state arrangements. Particularly the explanations for cross-national variation in educational differences have not yet been tested for economic vulnerability, which actually is considered to be the main innovative contribution to previous research.

Linear multi-level models on the ESS data of 2002, 2004 and 2006 showed that low-educated persons are economically more vulnerable than higher-educated individuals. These differences are best explained by the lack of labour market success of the low-educated and by lower levels of educational and occupational resources of the spouse. Both explanations refer to a lower capacity to generate income, which increases economic vulnerability levels.

The extent to which processes at the contextual level render the low-educated better able to secure an advantageous labour market position through individual and social resources probably explains why in some countries low-educated people are less economically vulnerable than in other countries. In addition, we hypothesize that the extent to which welfare states provide a financial safety net in the event of disability, unemployment or if retired from work also explains cross-national variation in economic vulnerability among the low-educated.

Virtually all of our cross-level interaction hypotheses proved to hold. Our findings suggest that employers might have different beliefs in different countries about the group's productivity as a whole. The higher the proportion of people with a low-estimated cognitive competence within the low-educated group, as a proxy for this mechanism, the more economically vulnerable the low-educated are compared to higher-educated citizens. This evidence actually supports propositions by Solga (2002, 2008) and implies that in these situations employment opportunities have deteriorated; employers are less willing to invite them for job openings based on the (perceived) characteristics of the group as a whole. It may turn out to be difficult to affect such perceptions. Yet, ensuring that educational systems function in such a way that even the lowest-educated people leave school with a relatively high level of cognitive competence, which is particularly the case in the Nordic countries, Germany and the Netherlands (Gesthuizen et al., 2010), will probably have a positive influence on them.

The proportion of low-educated spouses within the group of low-educated varied considerably across nations, which explains why in some countries the low-educated experienced higher levels of economic vulnerability than in other countries. These findings imply that through (over-time) impoverishment of social resources, low-educated people are less able to secure favourable labour market positions and thus to generate enough income to avoid economic vulnerability. These findings also support previous but thus far untested claims for economic vulnerability based on income measures (Solga, 2002, 2008; Gesthuizen et al., 2010).

A country's structural labour market conditions proved to affect the level of economic vulnerability among the low-educated. As argued in the theoretical section, processes of skill biased technological change that took place in all modern economies might have had positive consequences for the low-educated. The decreasing share of elementary jobs has upgraded the labour market to which they have access to, resulting in rising wages and less dangerous or otherwise unfavourable work. Indeed, in countries where the average socio-economic status within the group of low-educated people is higher, educational differences in (experienced) economic vulnerability are smaller. Skill biased technological change also went hand-in-hand with a stronger process of educational expansion. A high level of high-skill supply compared to high-skill demand proved to be disadvantageous for the higher educated themselves, and not so much for the low-educated.

Finally, a higher level of social security expenditure turned out to reduce economic vulnerability risks for the low-educated in particular. As a result of their lack of labour market success, they are likely to have to apply for social security and they suffer the least from economic vulnerability in countries that guarantee a high level of financial security, which may be considered to be 'new' evidence supporting the theory of welfare state regimes (Esping-Andersen, 1999).

Of course, attaining a diploma is the best route to generating sufficient income to alleviate the risk of economic vulnerability. But, given that, our findings strongly suggest that, apart from individual attainment processes, contextual processes also affect the opportunities of low-educated people in avoiding economically vulnerable situations. Particularly the level of cognitive competence of the group of low-educated people as a whole explained why in some countries the low-educated are much worse off than in others (independently of individual cognitive competence). If states are able to create an outflow from schools of low-educated individuals who are nevertheless relatively competent, this probably reduces their economic vulnerability. In such cases, employers might be more willing to hire them because they believe in their productive capacities. Furthermore, the extent to which welfare states create a financial safety net for the most vulnerable groups also reduces economic vulnerability, as does the openness of society in terms of access to high quality social resources for the low-educated and to relatively favourable jobs.

These findings, in sum, might give governments some inspiration about the ways in which they can add to reducing economic vulnerability among vulnerable groups such as the low-educated, and subsequently reduce the negative individual and societal consequences of individual economic vulnerability.

Appendix A

Table A1 *Descriptive statistics*

	Minimum	Maximum	Average
Individual characteristics (n=49,050)			
Economic vulnerability	0	100	38.49
Low educational attainment	0	1	0.29
Intermediate educational attainment	0	1	0.44
High educational attainment	0	1	0.27
Low parental educational attainment	0	1	0.53
Intermediate parental educational attainment	0	1	0.31
High parental educational attainment	0	1	0.16
No partner	0	1	0.30
Low-educated partner, not working	0	1	0.08
Low-educated partner, low SES	0	1	0.05
Low-educated partner, intermediate SES	0	1	0.09
Low-educated partner, high SES	0	1	0.01
Intermediate-educated partner, not working	0	1	0.07
Intermediate-educated partner, low SES	0	1	0.04
Intermediate-educated partner, intermediate SES	0	1	0.16
Intermediate-educated partner, high SES	0	1	0.03
High-educated partner, not working	0	1	0.03
High-educated partner, low SES	0	1	0.00
High-educated partner, intermediate SES	0	1	0.06
High-educated partner, high SES	0	1	0.09
Low-evaluated cognitive competence	0	1	0.05
Intermediate-evaluated cognitive competence	0	1	0.24
High-evaluated cognitive competence	0	1	0.70
Full-time work	0	1	0.64
Inactive	0	1	0.13
Unemployed	0	1	0.09
Working 0 to 11 hours	0	1	0.01
Working 12 to 24 hours	0	1	0.06
Working 25 to 34 hours	0	1	0.07
Socio-economic status	10	90	45.56
Male	0	1	0.49
Female	0	1	0.51
Number of persons in household	1	15	2.93
No children	0	1	0.49
Youngest child over 18	0	1	0.10
Youngest child between age 0 and 3	0	1	0.12
Youngest child between age 4 and 12	0	1	0.19
Youngest child between age 13 and 18	0	1	0.10
Age	0	5.5	2.70
Age squared	0	30.25	8.69
Born in country	0	1	0.86
Born outside country	0	1	0.14
City	0	1	0.16
Suburb	0	1	0.15
Small town	0	1	0.30

(continued)

Table A1 *(continued)*

	Minimum	Maximum	Average
Village	0	1	0.31
Farm	0	1	0.08
Contextual characteristics (n=22)			
Social security expenditure (/10)	−0.87	0.76	0.00
Employment protection legislation	−1.60	1.11	0.00
High skill supply-demand ratio (*10)	−6.38	4.50	0.00
Average SES within low-educated group	−0.62	0.53	0.00
Low cognitive competence within low-educated group (/10)	−0.94	2.06	0.00
Low-educated parents within low-educated group	−0.42	0.20	0.00
Low-educated spouses within low-educated group	−0.32	0.32	0.00

Source: ESS 2002, 2004 and 2006.

Table A2 *Bivariate correlations between contextual characteristics, 22 countries*

	SSE	EPL	SD	SES	COG	PAR	SPOU
Social security expenditure (SSE)	1.00						
Employment protection legislation (EPL)	0.15	1.00					
High skill supply-demand ratio (SD)	0.16	0.36	1.00				
Average SES within low-educated group (SES)	0.43*	−0.05	0.28	1.00			
Low cognitive competence within low-educated group (COG)	−0.20	0.19	−0.36	−0.56**	1.00		
Low-educated parents within low-educated group (PAR)	−0.13	0.38∼	−0.03	−0.10	−0.11	1.00	
Low-educated spouses within low-educated group (SPOU)	−0.16	0.36∼	−0.18	−0.15	0.03	0.92**	1.00

Source: ESS 2002, 2004 and 2006.
∼ $p < 0.10$; *$p < 0.05$; **$p < 0.01$.

Table A3 *Model selection, forward stepwise procedure*

	Log likelihood	*p*-value LL ratio test
0: Model 0 Table 1	−228208	
1: Model 1e Table 1	−218680	0.00
1 + COG (2)	−218640	0.00
2 + SPOU (3)	−218611	0.00
3 + SSE (4)	−218595	0.00
4 + SD (5)	−218585	0.02
5 + SES (6) Model 3 in Table 3	***−218575***	***0.02***
6 + EPL (7)	−218573	0.57

Notes

1. It is important to note that as we only have information on household income, the effect of the spouse's educational level on economic vulnerability might also be explained by the (lack of) labour market success of the spouse him or herself. Even though we are unable to determine the share in the household income of each partner, we are able to take account of the earning capacity of the spouse, by including whether he or she works, and, if so, the occupational status of the spouse's job. We decided to combine spouses' educational and occupational attainment within one variable (see measurement and Table 1).
2. It could also be argued that it is not general social security expenditure that matters for vulnerable groups, but rather the extent to which income is really delegated to them when they are in need. For our purpose, gross unemployment replacement rates (e.g. Korpi and Palme, 2003) might therefore be better measures for tapping welfare state arrangements. However, models estimated using OECD gross unemployment replacement rates rather than social security expenditure led to less improvement in model fit. We therefore decided to use social security expenditure as a general measure of welfare state arrangements.
3. We set out with the cumulative data set that combines the 2002, 2004 and 2006 rounds and contains 139,586 cases. After selecting 15 to 70-year-old people who were not in school or retired, 82,112 respondents remained, and after selecting the households with a valid score on household income and economic strain, 56,671 respondents were left. Finally, listwise deletion of missing cases resulted in the final number of 49,050 respondents.
4. Analyses of the separate indicators of economic vulnerability lend credibility to the procedure used (results available upon request). Conclusions are similar to those drawn in the results and conclusion sections. This makes sense because there is a large overlap between income level and economic strain (the correlation is 0.47) that represents the latent construct we wish to measure. But particularly in the final, most extensive, model, using the measurement that combines income and economic strain leads to more powerful results (more significant cross-level interactions can be included). This is not surprising, because it is a more precise, i.e. more reliable, measure of economic vulnerability than the separate indicators are.
5. It would have been better if a cross-nationally validated measure on cognitive competence had been available, such as the literacy test available in the IALS data set. The current measurement serves as an approximation at best. Apart from being a subjective measurement, the score that the interviewer gave might be influenced by the respondent's answers to the questions on for instance educational attainment and labour market success. We recognize these problems and therefore consider all results related to cognitive competence as tentative. We nevertheless believe that our findings lend some credit to the validity of the measurement (see note 6).
6. These findings are equivalent to results presented by Kerckhoff et al. (2001), who find that cognitive competence has an independent effect on income, apart from other resources. In their case, however, cognitive competence was based on the thoroughly cross-validated measurement of literacy in the IALS data set.
7. These figures are calculated as follows: For the low-educated, the estimated percentile is the constant of 62.36 minus –0.94 times 1.26. This comes down to the 61.18th percentile. –0.94 is the lowest score on the proportion of low cognitive competence among the low-educated, and 1.26 is the main effect of this variable. For the high educated, the calculation is identical, except that for them the main effect of education (–7.56) and the interaction between the contextual characteristic and educational attainment (–0.94*–3.37) should be added to the equation. 62.36 + (–7.56) + (–0.94*1.26) + (–0.94*–3.37) = 56.78. The difference between the low- and the high-educated in this case is therefore 61.18 minus 56.78, i.e. 4.39. If we were to replace the lowest proportion of low cognitive competence among the low-educated (–0.94) by the highest proportion (2.06), the percentile difference would come down to 64.96 minus 50.45, i.e. 14.50 percentiles.

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